Charge to the COUPP Installation Readiness Review

December 2009

The COUPP 60kg bubble chamber (E-961) has been assembled and is undergoing initial commissioning in the D0 Assembly Building. Initial commissioning is being carried out in D0 where there is full crane coverage and reconfiguration is much simpler than in the MINOS hall. It is anticipated that the experiment will be ready for installation in the MINOS near detector hall for a first run early in 2010. The goal of this run is to demonstrate the backgrounds are under control, and this is expected to take most of 2010. If this run is successful, the collaboration proposes to move the 60 kg chamber to SNOLAB and do a deep underground dark matter search.

The COUPP project was reviewed on Dec 10, 2008 by PPD (http://www-ppd.fnal.gov/DivOffice/internal_rd/Reviews.htm) and on May 11, 2009 by FCPA (http://astro.fnal.gov/projects/Reviews.html). At these reviews the plans for completion of the chamber, hydraulics, cameras, DAQ system, and veto systems were presented. The COUPP proponents have made significant progress on this project since these reviews. However, while it was anticipated that the experiment would be ready to move underground by the summer of 2009, the commissioning in D0 is still in progress.

The purpose of this review is to evaluate the preparedness of the experiment for the move to the MINOS near detector hall, and to advise the project, the FCPA and PPD on any actions that are needed to ensure that the installation can take place as early as reasonably possible. This will be a technical review of the status of the project not a review of the science of the experiment.

The reviewers should evaluate the technical progress of the baseline project and each of its systems. The systems include bubble chamber and mechanical systems, camera and illumination, DAQ hardware and software, and the veto. The evaluation should cover:

1. Has the implementation plan presented at the prior reviews been completed? Have the requested resources been applied to the project?
2. Are each of the baseline components on track for full operation and installation in the MINOS near detector hall by January 2010?
3. What are the remaining technical issues for each system? Can these be resolved in a timely fashion or is a change in design or scope needed?
4. What system(s) set(s) the critical path for installation?
5. What resources are needed to complete the complete commissioning in D0?
6. What resources will be required for the move and installation in the MINOS near detector hall (people and durations)?

The proponents have expressed interest increasing the scope of the project to include installation of acoustic sensors on the 60kg chamber prior to installation in MINOS. This would result in a second test run in D0 prior to installation. The committee is asked to evaluate this proposal.

1. What additional information will be gained by a test on the 60kg chamber over what can be learned with existing tests on the smaller (4kg) chamber?
2. What additional resources will be required to carry out these studies?
3. How much will this proposal delay installation in the MINOS near detector hall?
4. Is it feasible to install the acoustic sensors after the chamber has been moved

underground? What would be the impact on the overall schedule?